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THESIS

A FEASIBILITY STUDY OF THE ASSIGNMENT OF WOMEN TO DD-963 (SPRUANCE) CLASS DESTROYERS

by
Stephen W. Deutermann

December, 1984

Thesis Advisor: Mark J. Eitelberg

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This thesis examines the issue of the feasibility of assignment of women to the DD-963 (Spruance) class destroyer. The author has gathered published information in the general topic areas of "women in the military" and "gender integration in the Navy, as well as information on the ship itself in order to form a framework for analysis. Work related standards of strength are examined, as well as attitudinal data collected from various surveys on the

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With the growth in the size of the Navy's fleet to six-hundred ships and the projected decline in the available pool of eligible 17- to 23-year old males through the mid-1990s, the increased demand for talented youth in both the Armed Services and the private sector leads to an examination of "non-traditional" sources for qualified accessions. Among these are women, reserves, civilians, and male conscripts. This thesis focuses on the more effective and expanded use of women, made more possible now because of technological advancement and a shift in public attitudes.

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A Feasibility Study of the Assignment of Women to DD-963 (Spruance) Class Destroyers

by

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Lieutenant Commander, United States Navy
B.A., Marquette University, 1974

Submitted in partial fulfillment of the
requirements for the degree of

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The author concludes that there is a basis for support of the experimental assignment of women to the Spruance class destroyer. Although current laws and policies prohibit the assignment of female crewmembers to this ship class (on other than a temporary basis), the ship's unique characteristics (e.g., enhanced habitability, automation and modular systems), increase the feasibility of full-time service by females and nullify many of the long-standing arguments used to restrict participation by women. Further, there is evidence of a growing acceptance of the concept of "women at sea" among naval personnel, policymakers, and the general public.

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I. INTRODUCTION AND BACKGROUND

The issue of the assignment of women to combat duties in general and to combatant ships of the Navy in particular is controversial and often divisive. There is a mix of societal values, Service tradition and economic and political reality at work which make this topic difficult to examine from a detached, objective point of view.

The goal of this thesis is to present a framework for analysis of the feasibility of assignment of female personnel, both officer and enlisted, to a somewhat revolutionary class of Naval combatant, the U.S.S. Spruance (DD-963) class destroyer.

The approach taken is to seek to answer the question of "can it be done" instead of the question "should it be done".This latter question is to be resolved as public policy is enacted and as a result of evolving social opinion and the needs of the service. Concurrently, this study seeks to address the issue of "if it is to be done, how best to do it."

A. METHODOLOGY

The method of this study is fourfold. First, it examines the historical issue of women in the military, the Navy, and in ships in general. This is accomplished primarily by means of a review of the subject literature. Second, it examines the Spruance class destroyer itself; what is unique about the ship's design, its crew manpower determinations method, and the implications for the possibility of a gender-integrated crew.

The third approach of this study is a review of the functional aspects of assigning crews to ships, the workload methodology of computing ship manpower documents (SMD's), strength requirements, physical standards determination, shipboard architecture, and habitability. This is done to attempt to determine whether or not current methodologies address integration, or possible integration of crews aboard Navy ships, traditionally an all-male environment.

Finally, this effort looks at attitudes. Specifically, what are the attitudes of sailors on ships with women aboard, what are the attitudes of gender-integrated crews in the Coast Guard and in other nations' Navies, some with women in combatant ships? Last, within the attitudinal spectrum, this study looks at the views of the crew of a Spruance class ship toward the idea of incorporating women into their midst.

B. MOTIVATION FOR THE STUDY

This thesis was undertaken to examine an alternative solution to a major problem the services will face as the decade of the eighties progresses; that is, the declining pool of eligible 17-to 23-year-old males available for military service. This pool is forecast by the U.S. Census Bureau to be declining to about eighty-five percent of its current size by the early part of the 1990s. With a growing fleet size (from 490 to 600 ships), a program of the Navy's over the same period of time, and with predicted growth in the private sector a strong possibility, the Services appear to have several options for maintaining manpower strength that come readily to mind :

1. Resurrect conscription of some type.

2. Increase the rate of compensation for military personnel (including benefits) and other incentives to make the military more competitive with the private sector.
3. Lower entry standards for education and aptitude.
4. Spend more on advertising and recruiting budgets.
5. Change physical and age restrictions.
6. Replace military personnel with civilians in selected billets.
7. Expand the utilization of women.

The first three are difficult choices. A draft of some type could cause significant societal upheaval and is not likely to gain Congressional approval. Paying a genuinely competitive wage will severely strain an already ballooning personnel budget. And lowering entry standards does not appear to enhance the operational effectiveness of an ever more technically oriented military.

Spending more on recruiting and advertising budgets would direct funds away from weapons or personnel programs where their need may be more immediately felt and measurable. These budgets are also under Congressional assault for being too high now, as reflected in the current debate over deficit reduction.

Modifying age requirements and physical standards is immediately feasible, but would have significant implications for the long run in terms of the age of the career force and the health and well being of the force. These warrant further study and are being studied.

Replacing military with civilian personnel is also immediately feasible (however, with limitations). Non-uniformed personnel do not have the same performance obligations as those in uniform do, should war erupt, and they are not the answer when addressing a potential shortage of personnel to fill combat billets.

It is the last of these options, the expanded use of women, that seems to stand out as a more immediately feasible alternative, at least for academic and policy examination. Women constitute roughly half of the American population and are currently about six percent of the Navy's total manpower [1] according to Department of Defense statistics. There appears to be an economic logic for increasing the utilization of this human resource. There also appears to be congressional interest as indicated by Rep. Les Aspin, chairman of the House Armed Services Subcommittee on Military Personnel and Compensation. Commenting on a recent Navy action to permit women to deploy in aviation detachments on replenishment ships, Aspin was quoted as favoring increased utilization of women:

> Aspin praised the Navy's decision to allow women officers to be deployed for up to 180 days on Mobile Logistic Support Force shipsin the 6th and 7th Fleets. "Substantial additional opportunity exists for further expansion of shipboard assignment for women which, if not forthcoming, may require future legislative direction," Aspin said. [Ref. 1]

It is the aim of this study to examine the unique aspects of the Spruance class destroyer, and to examine the possibility that, because this ship class is a revolutionary departure from previous naval combatants, the assignment of Navy women to the class should be explored. This is intended to be explored within the framework of expanded roles for women as the nature of service in the Navy changes and the decade of the 1980s progresses. Not an exercise in social experimentation or equal rights, this study simply addresses the issue of how to make the most effective use of a human resource.

---

[1] Source: Department of the Navy, NAVPERS 15658, Third Quarter FY-84 Navy Military Personnel Statistics, Washington D.C. June 1984

C. HISTORICAL BACKGOUND: WOMEN IN THE MILITARY,COMBAT, AND SHIPS

Historically, the participation of women in combat is nothing new, although the role they have played in the wars of the past has been limited. From early records of military history dating back to the Roman and Greco-Trojan wars of antiquity there can be found some mention of the part women have played, in most cases indirectly and in some directly, in combat. [Ref. 2] It is toward modern warfare, however, that this examination is directed; that is, the period from the turn of the century to the present, in which the nature of naval combat has evolved into its present state.

To begin with, the concept of women in combat is polarized idealogically by both its proponents and opponents. Historian Michael J. Gregor writes:

> What one sees in the debate about women in combat is the clash of two world views. The advocates of women in combat place faith in man's ability to reason and his ability to shape his environment to suit his will. The opponents of women in combat find the nature of combat and combat performance to be largely beyond man's control... These are irreconcilable differences. [Ref. 3]

These "irreconcilable differences" lie at the heart of the controversy surrounding the issue of assignment of women to combatant jobs in the Services. Pertinent questions arise:

1. Can or should women be included in the violence of modern warfare?

2. Can or should women be protected from war, particularly considering the nature of modern nuclear and conventional warfare?
3. If included, can women function as effectively as is required by a combat situation?

The first question cannot be answered empirically or satisfactorily by any individual effort due to the "irreconcilable differences" mentioned above. The many opinions, objective, subjective, reasoned or not cloud the issue so as to render it invisible.

The second question, similarly unanswerable from an empirical standpoint, has some interesting insight shed upon it by those who are directly familiar with the changing nature of modern war at sea. In a 1982 interview in Government Executive, Rear Admiral James R. Hogg, then Director of Military Personnel Policy for the Office of the Chief of Naval Operations, stated:

> The Question is 'Do we take the women off' (of ships) - the answer is 'no'. They are serving in that ship because the mission of that ship is noncombatant. The fact that the ship is going to get underway and go into a forward theater doesn't change the mission of the ship. A tender could be struck by the enemy even if it is in its home port, here in the United States. [Ref. 4]

Perhaps the issue of "can women (in the Navy) be protected " is becoming moot, with the advent of long-range cruise and guided missiles, modern warheads and tactical procedure. With these, an enemy remains "over the horizon", unseen.

Finally, the third question yields some room to maneuver and examine the issue more clearly. The idea of women functioning alongside men in war has an additional perspective from which it may be viewed; that is, the impact of a gender-integrated force on the perception held by both allies and potential foes of U.S. combat effectiveness. Again quoting Gregor:

> If the purpose of an Army is to deter war, then the army must appear terrifying to its enemy....Since the Soviet Union excludes women from its combat formations, and even accepts training deaths as a neccessarry cost, observers argue that introducing women into combat for domestic or social reasons necessarily diminishes our allies' confidence and our enemies' dread of our combat potential. [Ref. 5]

It is interesting to note that, historically, the Soviet Union has had the greatest utilization of women in combatant roles.Cassin-Scott writes of the Soviet woman's role in World War II:

> The staggering losses suffered by the USSR throughout the war, and particularly in the first six months of unbroken German victories, caused such a desperate shortage of personnel of every type that the distincion between the sexes was quickly abandoned.At first women served in non-combatant roles - the usual medical, communications and transportation and logistic duties common to all women's services. But the continuing heavy losses brought them right into the front line, weapon in hand, by mid-1942, and they continued to fight right through the war. Women served in a wide range of capacities in all the technical branches including the artillery, and served as combat aircrews and as tank crews. [Ref. 6]

Similar accounts of women in direct combat roles are contained in Cassin-Scott's work.

If one endorses the concepts that the nature of combat is beyond man's control and that certain sexual stereotypes cannot be broken, then the debate cannot be resolved and at best an unsatisfactory status quo will be maintained.

Historically, however, the American combat experience in the twentieth century has provided some noteworthy examples. In an excellent article on military nursing history, Kalisch and Scobey describe the experience of American women during World War I:

> The women of the Army Nurse Corps assigned to European hospitals were, at various times, threatened from poison gas attacks, forced to seek shelter from shellfire, constantly exposed to the same communicable diseases that afficted the soldiers (especially influenza), subjected to squalid and verminous living conditions, and, perhaps more intensely than the combat troops, required to witness the pathetic results of the physical violence of modern warfare. [Ref. 7]

The authors also illustrate the valiant conduct and professional performance of women in combat during the tragic Bataan and Corregidor campaigns of World War II in the Pacific. Those nurses were exposed to identical conditions as male soldiers, were shelled, bombed and wounded during the fighting and yet managed to run their hospitals as effectively as was possible under those conditions. After the fall of Corregidor, the nurses were interned as prisoners of war and continued to serve valiantly.

In the Vietnam war, similar examples can be found. Major General Jeanne Holm, (U.S.Air Force,ret.) details multiple examples of the performance of military women in Southeast Asia :

> By the time U.S.forces were withdrawn, some 7,500 military women had served in Southeast Asia. Many of them returned with combat decorations, some with wounds inflicted by the enemy,others with psychological wounds by dealing firsthand with the horrors wrought by modern warfare... The women who were assigned to jobs in Southeast Asia during the war proved that, contrary to popular mythology and the image so carefully cultivated for them during the post-World War II period, the modern American woman is fully capable of functioning in a military role in a combat environment, even under hostile fire... The dangers and inconveniences routinely endured by nurses in the field, for instance, were generally greater than those experienced by the clerks, personnel specialists, intelligence officers, stenographers, and others, male and female, assigned to the headquarters in Saigon, Long Binh,or other major installations. [Ref. 8]

Further, the ability of a nation to control the nature of combat to at least some degree has been vividly demonstrated by the United States in its two most recent wars, Korea and Vietnam. In both cases, existing technology and weapons were restrained from use in combat despite their obvious desirability for the purpose of winning the war. This last point is not directly related to the case for or against women in the Spruance; however, it serves to illustrate the fact that "irreconcilable differences" are largely the result of opinion, not of historical fact.

As to how a potential enemy may view a sexually integrated force, particularly a seaborne one, a significant point to consider is that the threat of an incoming missile, bomb, or shell exacts the same dread from a prospective victim regardless of whether the launch trigger was activated by either a male or female hand. An army or fleet will be respected by any potential adversary if that adversary appreciates demonstrated effectiveness, superior firepower, and proven tactics. In an answer to the question "what influence would having women in combat positions have on real and potential opponents," Richard D. Hunter of the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics) stated:

> That is an important issue. In the case of the Soviets, I don't believe it would make much difference because they tend to think in terms of firepower. I believe having women in combat units might make some difference to us, but we ought to think about it. [Ref. 9]

Additionally, one interpretation of how an ally might view a gender- integrated force is that of progressive innovation as a result of contemporary societal values; that is, if an integrated force is pioneered by the U.S., is it an effective step which should be taken by an ally? Segal (1983) states:

> The perception of our military effectiveness by our allies and potential adversaries is crucial to national

> security... It is clear that the leaders of other nations have been closely observing U.S. policy in the role of military women. While some may regard their increasing role with disdain, other leaders are looking to the American experience in planning their own programs of increasing participation of women in the military. Many nations expect to experience social and demographic pressures similar to those that have led the U.S. to increased reliance on female personnel. This is most notably the case for the industrialized nations of the west. [Ref. 10]

Recent history shows an expanding role for women in the military in general and women in the Navy specifically. Table 1 summarizes the history of women at sea programs in the Navy from 1972 to the present. Current projections for numbers of women in the Navy through 1987 are included in table 2. As can be clearly seen from these data, growth in these numbers has occurred. Although current levels of females recruited are expected to remain at about 10,000 per year, women will still occupy a significant percentage of active force strength throughout the decade (roughly 12 percent). If a new role is made available from the advent of a revolutionary ship design, could not more effective utilization be made of a currently under-utilized (at least economically) human resource?

D. CURRENT STATUS OF THE WOMEN IN SHIPS PROGRAM

The first documented instance of the assignment of women to sea duty in the U.S.Navy occurred in 1813, when two women embarked in the frigate United States as nurses during the blockade of the upper east coast by the British. Since that time, women have served in a similar capacity during the Civil War and intermittently throughout the age of sail. [2] These women were usually wives of the ships' officers or crew, and went to sea as nurses and cooks.

---

[2] Source: Harold D. Langley, "Women in a Warship, 1813" Naval Institute Proceedings, Jan.1984

TABLE I

MILESTONES FOR NAVY WOMEN:1972-1984

Year	Event
1972	Entry into all Navy ratings authorized
	Women assigned to U.S.S.Sanctuary
	Chaplain and Civil Engineer Corps opened
	Restricted Line opened to Navy women
	Naval Reserve Officer Training Corps opened
	Assignment policies for women aligned with (integrated with) those for men
	Navy women eligible for war colleges
	First Navy woman flag officer appointed Director, Navy Nurse Corps
1973	Separate management of Navy women eliminated
	First women naval aviators begin training
	Different dependency status for women abolished
1975	Pregnancy discharge policy changed from involuntary to voluntary
1976	Women admitted to service academies
	First Navy woman line officer appointed to flag rank
1978	Law amended to permit women to serve on ships (non-combatant)
	Women assigned to first ships
	Warfare Specialties opened to women
1979	Naval Flight Officer program opened
	First woman carrier qualified
	Nuclear power and aviation skill ratings opened to women
1980	First Navy woman Limited Duty Officer
	Law requiring separate promotion and retirement policies for women repealed
1981	First Navy woman enlisted Surface Warfare Specialist
	First woman qualified as Officer of the Deck (OOD)of carrier Lexington (AVT-16)
	First women qualified in jet aircraft
	First women selected for TAR program (Training & Administration of Reserves)
1982	First woman selected for test pilot school
	Women permanantly assigned to Diego Garcia
	Pregnancy separation policy changed to retain those women with "substantial investments made by the Navy in training"
1984	Women in aviation detachments permitted to deploy for up to 180 days in ships overseas

Source: G.C.Sandler,"Women in the Sea Services,1972-82" Naval Institute Proceedings, May,1983

TABLE II
PROJECTIONS FOR NAVY WOMEN

Year	#of Women (active)
1984	40,191
1985	44,262
1986	51,400
1987	52,200

Source:M. Binkin;
America's Volunteer Military,Progress and Prospects
The Brookings Institution, 1984

In modern times, no documented instance of women serving at sea exists in the twentieth century until 1972, when the current program of women in ships was initiated by then Chief of Naval Operations Admiral Elmo Zumwalt, who issued a directive (Z-gram 116) allowing women aboard the hospital ship Sanctuary during the closing days of the Vietnam war. With the end of that war came an end to women on sea duty in the Navy due to legislative restrictions of title 10, U.S. Code.

Section 6015 of the code stated originally that:

> Women may not be assigned to duty in aircraft that are engaged in combat missions nor may they be assigned to duty in vessels of the Navy other than hospital ships and transports. [Ref. 11].

In 1978 the Code was amended to permit women to serve in any Navy ship, including combatants for temporary duty, and to be permanantly assigned to transports, hospital ships, and "vessels of a similar classification".This was interpreted by the Secretary of the Navy to mean auxilliary ships, such as tenders (repair ships) and Fleet support ships not assigned any primary combat mission.

In November of 1978, Navy women began their current status at sea when five women officers reported aboard the repair ship Vulcan (AR-5). From this beginning, the role of women at sea has grown considerably. Currently women serve in 32 ships with such diverse missions as Fleet repair and support, aviator training (U.S.S.Lexington AVT-16), deep submergence research and missile systems test and evaluation. Women aboard these ships serve in all Navy at-sea ratings. There are presently 3,909 female enlisted personnel and 347 female officers serving on active duty in ships. [3]

With the change in the law in 1978, warfare specialties previously closed to women were opened. Among these was Surface Warfare Officer (SWO), the specialty carrying the Navy officer designator of 1110. It is the specialty of those officers who serve principally throughout their careers in ships. In the SWO specialty, an officer must demonstrate his or her professional knowledge in all aspects of surface warfare including tactics in antiair, antisubmarine and antisurface operations in order to qualify. Additionally, an cfficer must perform a wide variety of seamanship and ship handling evolutions under direct observation of a ship commanding officer, and must be certified as qualified by a board of SWO's. All this after completing six months of formal classroom training. 1,654 Navy women have achieved warfare qualification. Currently, while no women serve in command of a Navy ship,they do serve as division officers and department heads. [4]

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[3] Source: NAVPERS 15658,p.6

[4] Source: NAVPERS 15658, p.8

Because of the limited number of department head, executive officer, and commanding officer billets afloat for women, those that choose to enter the surface warfare community face extremely limited horizons with respect to a career. Current policy restricts surface warfare accessions for women to a limit of 17 officers per year group (those commissioned within a given year). This limitation is keyed to the number of opportunities that exist for CO and XO afloat for women (that is, in non-combatant and auxilliary ships). In essence, those women who choose to go to sea must develop a skill or level of expertise such as a subspecialty designation (postgraduate degree 'P-code')in some area other than the warfare specialty to guarantee promotion and good assignments. They are, in effect, outpaced by the 'general unrestricted line'(1100 designator) women and men who are primarily 'subspecialists' with no warfare specialty (such as Surface, Aviation and Submarine). If some assignments to an increased number of ships such as the Spruance class were made available, particularly in department head and executive officer jobs, a more reasonable career path would exist.

For enlisted women the problems of restriction from combatants are subtler. With the current number of women in the Navy, there exist sufficient assignments and opportunities to enable a female sailor to complete a career. However, particularly in "non-traditional" ratings such as electronics technician (ET) or gas-turbine technician (GSE/GSM) as an individual advances to the more senior petty officer levels, the billets available ashore become extremely limited. This means that an E-6 ET (male in a combatant) completing four years at sea and eligible for shore duty may not find a billet that will use his skill because a female may currently hold the job. Conversely, a female E-6 eligible for sea duty, and needing sea duty to improve chances for selection to Chief Petty Officer, may find that there are no sea duty billets for which she is eligible, even though there may be a real need for senior ET's on destroyers. Expanding assignments for which women are eligible would seem to smooth the sea-shore rotation pattern as well as expand career oppotunities for women in "non-traditional" and valuable skills.

E. SERVICE TRADITION AS A DETERMINANT OF POLICY

The above sections briefly discussed the progression and status of women serving at sea in the Navy. Assignment policy in the Navy is determined based on two concepts: interpretation of federal law and the needs of the service. This policy is also, however, influenced by the very unique nature of service in the seagoing Navy; it is different than other forms of military service. Ships at sea are isolated communities. Their routine , the daily forms of both peacetime and wartime activity, have been developed over hundreds of years of tradition dating back to the sixteenth century traditions of the Royal Navy. While certain tactics are influenced by technology and weapons employments are evolutionary, a fleet at sea has certain aspects that remain unchanged. In fact, it can be argued that because of the isolation of ships deployed for long periods at sea, the Navy is the most tradition-bound of any service. In testimony before the Senate, Admiral Worth Bagley once stated:

> Men join the Navy for many different reasons; however, a certain portion join and remain in the Navy because they enjoy being in a job which has historically been associated with fellowship among men in a difficult and dangerous endeavor. Changing the fabric of the Navy by integrating women into all combat roles might well reduce the attractions of the Navy to this segment of mankind, as well as to some of those men who might, in the future, join the Navy and make it a career. [Ref. 12].

In short, tradition and the perception of tradition are important factors in the assignment policies and decisions of the Navy. The prohibition of assignment of women to destroyers and other combatant class ships is based fundamentally on the phrase "ships assigned a combat mission."

What is at the heart of the policymaking process regarding the assignment of women to combatant ships is the institutional inertia, present in any large beauracracy, which perceives no need to institute a new policy if there is no pressing operational requirement to do so. This is doubly so if such policy holds any tint of controversy. If there are sufficient men to operate the fleet, why change current policy?

Perhaps it would be useful to evaluate a pilot program of women in a Spruance crew. However, without significant congressional pressure or a severe shortage in available trained personnel, such programs rarely get off the ground. The Navy, in the persons of the Secretary of the Navy and the CNO, has the authority to declare just what kinds of ships are determined to have a combat mission assigned. Theoretically, the Navy could assign a particular ship or class of ships the status of training destroyer in a non-deploying status. This ship(s) could then be utilized, with full mission capability in all warfare areas, to train both male and female personnel in fleet operations at sea. Or, perhaps ships assigned to the Naval Reserve Force (NRF), currently designated as having combat missions, could be assigned a modified combatant status for the purpose of training the Reserves, both men and women.

These are options not currently under consideration in the policymaking offices in the Pentagon. However, should some contingency, crisis, unforseen legislative enactment or other need arise, it would perhaps be in the best interest of the Navy to examine the Spruance class destroyer, its most modern and capable combatant ship, to see if women could be more effectively employed.

F. SUMMARY

This chapter has attempted to review the historical background of women in military roles and the current status of Navy women in ships. In modern history there has been no precedent for the regular assignment of women to jobs or roles anticipated to be directly involved in combat. However, there is substantial documentation of numerous situations that have arisen, notably in WW II and Vietnam, where women have shouldered a combatant or direct combat support role and have performed at least as well as men.

Concerning women in the U.S.Navy, current policies are largely a continuation of traditional restrictions from combat assignment; however, significant changes have occurred which permit women to pursue non-traditional careers and enable women officers to develop warfare specialties. This appears to be a point of departure from the past in that the Navy is now including women in shipboard skills useful primarily at sea, and only secondarily in shore billets. With current restrictions prohibiting females from service aboard destroyers, carriers, submarines and other combatants, there appears to be an inequity between career development opportunities for women (which are limited because of these restrictions) and effective utilization of trained personnel. If the Spruance class destroyer is a radically new and different ship, enough so that many or all of the traditional objections to permitting women to serve aboard are softened or eliminated, utilization of Navy women on these ships appears to be a valid possibility.

II. THE SHIP, DD-963: WHAT'S DIFFERENT?

The evolution of the latest series of U.S. Naval combatants has included some of the most revolutionary design concepts in ship engineering history. The conventional warship design, in existence in its general form since 1886 with the launching of U.S.S. Bainbridge (DD-1), has been discarded. No longer was a mission defined, a hull built, and a weapons configuration "bolted on" to last the life of the ship.

With the development , commissioning, and operational employment of the U.S.S. Spruance and U.S.S. Oliver Hazard Perry class combatants, the Navy has fielded the first genuinely obsolescence-resistant ships ever launched, with a view toward the accomplishment of future missions not yet defined or articulated. The "expandability" of the ship's missions, limited in previous classes by fundamental engineering limitations ("... put one more gun on it and she'll roll over...") was greatly facilitated by integrating the most modern and efficient systems into a spacious large hull and by including the room and peripheral support for weapons still in the design stages.

A. WHAT HAS AND HASN'T CHANGED

The changes brought about by the Spruance class are fourfold:

1. Gas turbine propulsion.
2. "Modular" combat systems.
3. Fully automated weapons function and support.

4. Large increases in space, resulting in large increases in surface area and in volume.

The first of these , gas turbine propulsion, was a design "first" in the Navy. Major combatants had been powered by steam or diesel engines (or by some combination) since the turn of the century. The environment in ships' enginerooms had therefore been largely unchanged. The spaces were very hot, extremely loud, manually controlled by operators, and highly manpower-intensive to maintain and repair. The gas turbine plant spaces are fairly cool and relatively quiet, fully automated (at least by engineering design) and modular (if a component fails it is removed and replaced, earlier plants required in-place repairs more often).

This would seem to imply an immediate reduction in manning required to support the Spruance propulsion plant, and by application of the approved methodology for manpower requirement determination based on estimated workload, that is exactly the result obtained. Table 3 is a comparison of engineering department manpower levels for a conventional steam propulsion combatant (a Forrest Sherman class destroyer) with a Spruance class destroyer. The reduced manning overall and the increase in supervisor to non-rated personnel ratio are significant changes in this ship class, and indicate the growing requirement for technicians to operate what are essentially jet engine propulsion plants. Although this overall reduction in engineering manpower would seem to compensate for the shrinking male population to some degree, the fact remains that the class as a whole will require a number of engineers (as well as all other crew rates) to operate the ships. For a 33-ship class, the billet totals are roughly 165 officer and 2,475 enlisted engineers. Additionally, with the new combatant ship classes of the Kidd (DDG-993) and Burke (DDG-51) (which have similar gas turbine plants) being added to the fleet and increasing ship numbers by 40 or so more, the numbers grow to roughly 375 officers and 5,475 enlisted engineer billets. The essence of this is that the aggregate number of gas turbine plant operators represents a significant investment in training and human resources. If women can function effectively in this environment, should they be included as part of the trainable pool of talent? Further, the cost savings realized by decreasing the largely unskilled labor force of an old-time engineroom strengthens the argument for the use of women, at least from a work environment standpoint.[5]

TABLE III

COMPARISON OF ENGINEERING MANNING LEVELS

	DD-944	DD-963
Total Officers:	7	5
Chief Petty Officers:	7	6
Petty Officers (E-4/E-6):	73	51
Non Petty Officers:	33	18
Total Enlisted :	113	75
Ratio of Petty Officers to non-Petty Officers:	2.212	2.833

Source: OPNAVINST 5320 (SMD for DD-944 of July 82, SMD for DD-963 of June 84)

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[5] Although several studies have concluded that women have a higher tolerance for high-heat environments than men (see Phillips, Bogart and Pepper, 1981), the environment of a Spruance engineroom is, on balance, a less demanding one physically than those of previous classes, implying a less rigid restriction of physical capabilities and endurance

Several studies have concluded that the upper body strength required for ceratin ratings and billets, particularly in engineering and deck seamanship ratings, exceed the capabilities of most women. [6] With the advent of these new propulsion plants, the change in the workload and environment of the main machinery spaces of these ships as well as improvements in work reducing machinery support for the deck force (notably replenishment and cargo handling elevators and machinery), warrants examination to see if strength requirements have lessened to a degree that would make these billets compatible with assignment of women. (More on functional aspects is covered in Chapter Three.)

Two factors were not considered in the initial manning document (SMD) solution obtained for Spruance. [7] The first was that, while the manhour intensive labor support required for the earlier classes of ships was eliminated, the mix of operator skill required to run the plant changed. Although the number of individual components that had to be serviced by marginally skilled crewmembers was reduced, the level of training required by crewmen to service the components remaining was significantly increased. The net result of this was that while the aggregate number of propulsion plant crew was reduced, there was an increase in more senior, technically competent ratings needed for troubleshooting and maintenance. The implication of this for the consideration of integrating the crews of these ships is that, with the change in the structure of engineering department

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qualified to operate them.

[6] Source: R.L.Pepper; Naval Architectural Research for Women Aboard Ship, Naval Ocean Systems Center, San Diego,Ca,NOSC TR-818Sept 1982

[7] Details of the development of the Spruance class manpower planning development are extracted from: F.Nauta and T.White, Manning of Recently Fielded Systems, Case Study of the DD-963 (Spruance) Class Destroyer Logistics Management Institute, Washington,D.C., April 1981

organization on this class ship, there may be a change in the overall way of running this department that would enable a mixed gender crew to function effectively. What has traditionally been seen as an arduous, physically demanding at-sea job description for shipboard engineers may no longer be so. Currently, no women serve in the primary gas turbine rates (GS,GSE,and GSM), although they do serve in the electrical and interior communications rates which are applicable to Spruance plants. The gas turbine rates are, however, themselves new insofar as the ship class is new, and are largely filled by "lateral conversions" from the electrician, interior communications, and machinery rates. If women were admitted to the gas turbine rates, additional training costs would be incurred, the same costs that will be incurred as additional sailors are trained to fill existing billets. The training costs of future lateral conversions for both men and women would remain identical.

The second major area of change incorporated by the Spruance class was that of "modular" combat systems. This concept sets forth the idea that a ship may incorporate a given configuration of weapons and sensors today, and a different or enhanced version in ten years. Previous classes of combatant ships were designed with a nominal lifespan of twenty years, and were then extended to thirty years by means of service life extension programs (SLEP) due to shortages of usable ships. With Spruance, the Navy has a hull designed to last thirty years incorporating weapons systems designed to be easily removed and replaced with new or upgraded versions routinely, as funds and technology became available. The implication for manpower planning is that the validity of the old processes for determining a manpower plan designed to last the life of the hull is now changed every five years or so, as the ship is overhauled. Although this is may seem a subtle impact, when one considers the impact in dollars alone of a crew size change of as little as ten percent every overhaul cycle for a forty ship class could be quite large. The net result of this is that the planning process must be dynamic enough to identify future needs as new systems or missions are added. This process should address the total working environment, which would include the compatability of women with the job; that is, if women are technical resources for the long term, they could represent a larger pool of talent which would ease the growth of missions and capabilities of the ship class as these become feasible or necessary were they not restricted from serving on these ships.

The third area of change involves automation of combat systems. The incorporation of automation in the weapons suite of the ship has an impact similar to that of the change in the engineering environment. In the first place, the overall manpower requirements of people to actually man the gun and missile systems is reduced; and, with the solid state electronics, modernized cooling systems, and operator and sensor improvements of this class, the working environment has changed here as well. (Photographs of Spruance class systems showing their modular and modernized features are included in Appendix A.)

The existence of the combatant environment means a degree of manual oversight by highly trained personnel. The Spruance has the capability of locating, classifying, tracking, and destroying a target with no manual intervention. Weapons are automatically assigned and targets are engaged in order of threat priority as determined by the ship's fire control computer. In a general warfare environment, and for prolonged periods of time in that environment this is a vital feature. However, most surface ship operations today are conducted in what is known as "condition three" (wartime cruising) readiness. The ship must be ready to shoot, but only after certain conditions are met, only after certain permission is obtained. This means that the automation designed to reduce manpower must be overcome by safety-of-operation considerations. Again, the result is more highly skilled people, and is another argument for examining the changed and modernized environment to determine if restrictions on the assignment of women still apply.

Additionally, automation of weapons may ease operation of the weapons system, but maintenance requirements must be recalculated. A greater degree of own-ship maintainability will mean still more gifted technicians on the ship. Currently, female technicians are restricted to service ashore or on tenders. Could they support the systems in place, at sea on the Spruance?

The last area of major change brought by the new class was that of surface area of the interior and exterior of the ship. Because of the modular combat systems concept, these ships have nearly double the square footage of previous classes of combatants. In terms of exterior surfaces, the sea exacts a high toll in superstructure and hull corrosion. When the traditional methods were applied to the problem of painting and preservation, ("facilities maintenance"), the results indicated a near doubling in size of the deck force of the ship. This meant that, for the purpose of hull and superstructure preservation, manning in the Boatswain's mate rating would be higher than on the smaller, conventional combatants. Litton industries, the builders, proposed a novel solution used by commercial ships for years--that is, coating the interior surfaces of the ships with an epoxy which would eliminate the need for internal painting and preservation work. However, this solution was shortsighted and did not work; Navy ships are required to adhere to standards of cleanliness and appearance much higher than those of merchant ships. This is due to concern for the sanitation and health considerations of crews larger than those of merchantmen, cramped in hulls much smaller. The result was the requirement to paint interior surfaces just as they would have been in any previous class of ship. The net effect of all this is that Spruance class ships are short of the Boatswain's mates needed for this work. Currently, on the tenders and service force, and in some of the support ships in which they serve, women account for roughly one-third of the deck force. Could they not be as effectively utilized on a Spruance?

B. MANPOWER DETERMINATION METHODS

Current methodologies for the determination of manpower plans for new classes of U.S. Navy ships have evolved into standardized, almost ritualized procedures that produce highly reliable and predictable results. There are tomes of documentation that accompany the various teams that come aboard the new lead ship of the class; hundreds, even thousands of forms to fill out that ask crewmembers to list steps taken in a maintenance action and how long each step took. There are also highly standardized statistical procedures that derive the appropriate percentage of an available, fictitious "standard work week" that should be devoted to certain categories of time. The current methodology for SMD development is summarized as follows:

1. Identify watchstations and determine requirements for (numbers of) watchstanders.
2. Sum workloads by category, grade, and skill level (rate and rating).
3. Add allowances for productivity, service diversions, and training.(These are military related functions

not directly related to operating and maintaining the ship.)

4. Calculate non-watchstanding requirements (workload divided by productive time available per man).
5. Minimize manning by shifting workloads up one grade or skill to fill slack time.
6. Add directed manning.(These are full time, collateral functions such as Master at Arms and 3-M coordinator.)
7. Verify that enough personnel will be available to accomplish evolutions (such as flight quarters and underway replenishment, unique events not related to direct operation and maintenance work).
8. Adjust grade mix to ensure adequate supervision and military command structure. [8]

C. CONSIDERATIONS FOR PLANNING

The methodology currently used to develop SMD's is a good one. The definitions of the operational environments and required operational capabilities are valid. Also, for the most part the computations of workloads per category yield reliable results. What do not enter into the computations are those considerations that result in the kinds of effects discussed above. Questions such as "how different is the design consideration of this system from earlier ones?" are not asked. The change in mix of high to low skilled people must be addressed as technology advances. The idea that a system's components are modular and therefore require fewer technicians will not hold if the ability to diagnose and troubleshoot is not designed into the subject system.

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[8] Source: OPNAV 10P-23 Procedures for Ship Manpower Document Determination Office of the Chief of Naval Operations, Washington,D.C. 1978

Some considerations to be included into a revised approach might be:

1. Consider the operating environment as created by the system.(If you have eliminated crowding, heat, and noise, and automated the engineroom, can you change watchstation manning requirements to include women on the job?)
2. How automated is the new class, and how does this change the work environment of the ship as a combat system? Must there still be a manual backup for these automated systems? Can women perform here?
3. What are the practical tradeoffs available between own-ship capability and the maintenance from ashore? Does the new class require a higher percentage of technicians, and does the pool of female technicians provide a useful solution to the need?
4. What is the skill mix for the new system as opposed to the old system,and does this mix require a higher (or lower) ratio of supervisors to non-supervisors? If so, does the supervisorial talent of female petty officers, chiefs and officers lend a solution?

As more and more ships enter the fleet of the future, the importance of taking into consideration the departure from previous ways of doing business arises. The formulaic and statistical methods for determining a crew's size and composition have proven themselves as ships have been built since the 1950s. However, the error factor [9] as new classes with radical new features become operational is increasing.

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[9] This "error factor" is discussed at length in the Logistics Management Institute study by Nauta and White Manning of Recently Fielded Systems, Case Study of the USS Spruance

If somewhat uncomplicated adjustments are allowed to be incorporated into the manpower determination doctrine, alternatives such as the inclusion of women may present themselves as useful solutions to new problems.

The ship size, again in terms of volume, is larger than that of a Leahy (CG-16) or Belknap (CG-26) class guided missile cruiser, has less equipment and a little more than half the crew size. The amount of habitable cubic footage per crewmember is significantly increased as a result of this (an approximate increase of 30 percent over the FF-1052 class frigate when measured in berthing compartments). This results in a greater degree of privacy, traditionally a stumbling block for the assignment of women to destroyer-type ships. The living spaces on this class of ship, in addition to being larger, are not in "traffic streams" as are those of previous combatants. They also each have their own lavatory ("head") facility. Although there is no documentation that women require more room than men, as mentioned above, the overall improvement in habitability is an improvement in the living environment as a whole. Greater privacy, improved facilities in messing and berthing and more room are a positive step for the crew, regardless of its gender composition.

D. SUMMARY

The introduction of the Spruance class destroyer into the Navy's fleet has brought with it significant changes to life aboard combatant ships at sea. Gas turbine propulsion, modular systems design and automation have changed the skill mix required to operate the ship effectively, from labor intensive to technician intensive. While proportional crew size-to-displacement ratios have decreased (that is, the same number of people required to operate older, smaller ships now operate a larger, more modern one), the technical capacities of the crew must be greater to operate this ship properly. Additionally, increased living space and habitability improvements make this ship class less cramped and more "endurable" than previous classes of destroyers. Because of the nature of the changes incorporated by this ship class over its predecessors, there appears to be a new opportunity to further study the feasibility of assigning women to ships of this class.

III. RESULTS OF FUNCTIONAL RESEARCH

This chapter will look at some of the human factors, or ergonomic considerations in manpower planning for Navy ship classes. Specifically, the targets of this analysis will be strength requirements for performance of various jobs on a Spruance class destroyer; that is, whether or not strength requirements are considered for the crews of ships.

A. STRENGTH REQUIREMENTS

Traditional combatant ship design is evolutionary. Known systems and equipment are modified in some way and installed in a new ship that has been designed as an incremental improvement over its predecessor(s).

This has changed with the advent of the Spruance class. As discussed in chapter 2, this ship has revolutionized some fundamental considerations of ship design, from the ship's systems themselves (propulsion, weapons, sensors, and others), to the method of acquisition and maintenance of the ship. The result has been a sort of "assembly line" production of a totally new seagoing weapon system. Has this also meant a change in the physical requirements of the crew to operate and maintain the ship effectively?

Current documentation of the strength requirements of shipboard jobs is limited and is not a factor in the determination of ship manpower requirements. Some preliminary research has been conducted by NPRDC and by the Naval Ocean Systems Center (NOSC) and has yielded the following results:

1. Most "general military" Navy jobs utilize upper torso muscles to a greater degree than other muscle groups.

2. Most women are weaker than most men in upper torso strength. However, variations about average strengths result in strength distributions wherein some women are stronger than some men.
3. Recruit training programs designed to increase strength, such as calisthenic-type exercises and some types of military drill, yield increases in both strength and reach capabilities for both men and women. Depending on certain classifications, such as age group and height and weight category, certain strength and reach increases that occur are greater for women than for men. Conversely, strength measurements taken after recruit training show a decline in those areas which recruit training did not encompass, such as pull-ups and hand grip strengths.
4. Because of the task inventory for shipboard jobs, notably opening and tightening scuttles and watertight doors, opening and closing large valves, pull-starting emergency dewatering pumps, and exiting through scuttles and hatches, strength standards are extremely difficult to establish.
5. Ergometer measurements, administered to recruits before and after training, showed similar results in terms of improvements and degradations, for both men and women, although average female strength remained below average male strength.
6. Success (and failure) rates for tasks tested, such as putting out fires using portable extinguishers and pull-starting pumps, correlated positively (negatively) with body weight. [10]

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[10] Sources for this information are extracted from D.Robertson "Physical Requirements for Navy Jobs" and M.M.Ayoub "Human Engineering Studies related to Women in the Military", both included in Gender Integration in the Military, Presentations at the Naval Postgraduate School R.S.Elster, ed. Task tests were conducted by NOSC and were

These results have been validated in several studies, conducted by both private industry and by the military. What they have to do with the concept of assigning women to the Spruance class rests in the interconnection between physical strength standards determination and selection and training for shipboard crews. Current directives for determination of ship crew makeup, primarily OPNAV 12P-23 (SMD doctrine) and OPNAV instruction 1600.1E (Manpower requirements determination for the Navy) are based on the allocation of time required to accomplish categories of functions on ships. This includes standing watches, performing corrective maintenance, training, recreation and a variety of others. Compiling known data regarding the ability of a group of the population to do these things at all, and integrating this to develop a procedure to assign women to ships is not done, not even in the case of ship classes to which women may be assigned.

Additionally, "job analysis" from a functional (task inventory) standpoint is not done for new classes of ships. What is done in the case of a new class is to require the contractor (builder) to determine an estimate, based on time study, of the number of sailors required to operate, maintain, repair and fight the ship. This estimate is then presented to the Navy project office for the aqcuisition of the ship for approval. Once approved, this estimate becomes the commissioning crew of the first ship of the class. It is then left to the Navy to validate the estimates, which is accomplished through on-board observation by validation teams from offices ashore, [11] and from the observations of the Captain and supervisors and officers of the first crew.

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reported in R.L.Pepper's *Naval Architectural Considerations for Women aboard Ship* NOSC,San Diego, Ca, 1982

[11] Naval Manpower Engineering Teams (NAVMETs)

While this is a "trial and error" type approach, it does work, with generally only minor problems. It does not incorporate much flexibility in that no consideration is given to which billets could be held by women based on functional analysis. The implication of this is that functional considerations, specifically those concerned with strength requirements for Navy jobs, are not critical for the current assignment practices of the Navy to work for new classes of ships. Much of the research conducted in this field has noted that, for those portions of the populations of men and women which overlap, that is, generally weaker men and average strength women, equal difficulties and failures occured. The large majority of average strength and stronger men is quite sufficient to compensate for strength deficiencies on the part of weaker men in the crews. Therefore, from a practical point of view, the assignment of weaker men to a ship's crew would not have as significant an impact on readiness as would the assignment of a complement of women.

It is useful to compare the study of strength requirements for ship jobs with the characteristics of physical requirements for aviation jobs in the Navy, where certain characteristics such as reach, grip, strength, hip-to-knee distance and others are routinely used to assign crews. These are critical screening devices for the assignment of aircrews and pilots due to the directly measurable effects of any physical strength or reach deficiencies on the performance of aircraft. Women cannot fly F-14 fighters, not only because of the legal restrictions, but also because of the fact that the great majority of women do not have the reach capability to perform required tasks in the cockpit. They may, however, fly A-4 aircraft (in training missions only), because the dimensions of the cockpit are smaller and happen to be designed so that women generally have no problems operating the aircraft.

The pertinent point of this is that in one category of military occupation the requirement for strict adherance to strength, reach, and other physical standards justify their use as screening and selection devices.

This is not the case in ships with all male crews. Due to the fact that a crewmember unable to perform even a vital task because of a strength deficiency can be immediately assisted by a stronger shipmate, such strict measures of strength are not needed to crew ships. Also, because of the fact that the individuals of the crew of a ship are required to perform an extremely wide variety of tasks every day, selection and screening based on strength requirements for the more demanding jobs would be inefficient. This is due to the compensatory nature of having shipmates around that can assist.

It may be argued that the same compensatory feature would enable women to function effectively in any department of a ship. However, since the proportion of women requiring assistance to perform the more physically demanding jobs is greater than that of men, the impact of their assignment to all billets on a combatant ship, in terms of ability to perform under battle conditions, is unknown.

Perhaps a method of resolving the strength issue is through experimental assignment of women to shipboard billets for the specific purpose of determining the ability to perform the range of ship-related jobs (damage control training and seamanship evolutions, such as cargo handling, are examples). If such experimentation results in the finding that women are unable to perform required tasks due to strength limitations, then a logical conclusion is that minimum standards would have to be met for women to be assigned to seagoing jobs. This would impose some additional cost in the training pipeline and the selection process, and would have to be factored into the policy determination regarding the assignment of women to combatant ships.

B. SUMMARY

This chapter has addressed the issue of the strength requirements of Navy jobs on ships. Although there is a basis in academic research for measuring strength and other physical characteristics required to perform certain tasks, there is currently no interconnection between these measurements and the selection and assignment of crewmembers to ships as there is for assignment to aviation jobs.

In order to resolve the question of the ability of women to perform effectively on combatant ships, more data in the area of strength requirements for these jobs is needed. Since previous tests have concluded that most women are weaker than most men in areas of strength pertinent to shipboard jobs, experimental assignment of women to these billets would provide information on whether such deficiencies are significant. If they are determined to be so, then development of strength standards is indicated, and the costs of such development must be included in formulating assignment policies.

IV. RESULTS OF ATTITUDINAL RESEARCH

This chapter will incorporate summary analyses of related attitudinal surveys and published documentation of integration programs conducted by the Military Services in the United States and other nations.

A. ATTITUDES

The attitudes of people working in any environment, be it work in the private sector or service in the armed forces, are critical to the success of their endeavor. Few would argue the point that success on the job is promoted more by positive attitudes than by negative ones. Nonetheless, there is difficulty in examining and measuring attitudes. Sudman and Bradburn have written:

> The terms "attitude," "opinion," and "belief" all refer to psychological states that are in principle unverifiable except by the report of the individual. Although we may make inferences about the validity of self reports from the relationship between people's behavior and what they say, our use of such validity criteria depends on our theoretical notions about relationships between psychological states and behavior. Further, the terms "attitude," "opinion," and "belief" are not well differentiated from one another. [Ref. 13]

Yet, a consistent methodology does exist for measuring and describing attitudes, and it is the objective of this chapter to:

1. Review attitudinal work that has been done in the subject area of "women in ships." This consists of survey and questionnaire data taken since 1972 involving Navy, Coast Guard, and other Navies in summary form.

2. Examine the results of an attitudinal questionnaire administered to the crew of a Spruance class destroyer regarding specifically "assignment of women to your ship."

There is considerable attitudinal data available regarding both the Navy's and other Services' programs with women in ships.

To begin with, the work of Thomas (1982, 1984) regarding the pre- and post-integration attitudes of the crews of Navy ships currently involved with the Navy's Women in Ships program is summarized below. Prior to the integration of the crews of six different Navy ships in 1979-1980:

1. The majority of men believed that incorporation of females into the crews would improve crew morale, but would have a negative effect on discipline and would increase interpersonal conflict.
2. Lower ranking men favored integration, although they held the most traditional attitudes toward the roles of women and expected women would receive preferential treatment in job assignments, physically demanding work, and disciplinary action.
3. Men working in departments where women are rarely found ("non-traditional" work) held traditional attitudes toward women's roles and were pessimistic about integration.
4. The women scheduled for assignment to these ships were most concerned about profanity, proving themselves, and resentment from men. [12]

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[12] Source: P.J.Thomas, Men and Women in Ships, Preconceptions of the Crews Naval Personnel Research and Development Center, San Diego,Ca.1982

After these ships incorporated mixed crews, a followup study showed:

1. The impact on attitudes made by fleet, ship and department assignments was statistically significant, the impact on attitudes made by deployment (the actual time at sea) was not.
2. Chief Petty Officers (the senior enlisted aboard) and non-rated men (the junior enlisted aboard) were enthusiastic about the impact of women on the perceived effectiveness of the ship and held a positive attitude about the integration.
3. Conversely, Petty Officers (mid-level enlisted) felt that women had led to a decline in discipline and leadership and preferred an-all male crew.
4. Sexual harassment was mostly verbal in nature and was being handled by the women themselves.
5. Those of the crew that had attended well presented preparatory workshops expressed positive attitudes; not surprisingly, those who had not attended these workshops did not have positive attitudes.
6. Finally, it was concluded, based on reports from participants and observers, that women were performing at least as well as men aboard ship (except in certain physically demanding jobs) and that the women have been well integrated into the crews.[13]

Additional studies of Navy women as a group indicate that they are generally positive in their attitudes toward the Navy. A 1978 survey, again by Thomas, of a sample of 400 women serving in operational commands throughout the Pacific resulted in the following conclusion:

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[13] Source: P.J.Thomas Men and Women in Ships, Attitudes of the Crews after One to Two Years of Integration NPRDC,San Diego, Ca. 1982.

> The respondents were overwhelmingly in favor of equal opportunity for Navy men and women. They see shipboard and aviation billets as essential to being competitive with male line officers and in widening their career options. [Ref. 14]

The above mentioned studies are the most comprehensive to date on the attitudes of crews in gender-integrated ships in the U.S.Navy. The U.S.Coast Guard and the Navies of other nations also have women serving at sea. Their data is useful for the purposes of this study.

B. THE COAST GUARD PROGRAM

Of the three U.S. 'Sea Services' (Navy, Marine Corps and Coast Guard), it is the Coast Guard which has gone furthest in the integration of women in ships. Women serve in command, in officer and in enlisted billets in all Coast Guard ship classes. The reason that the Coast Guard can do this is that, since this service is a component of the Department of Transportation, not the Defense Department or Navy, it is not included in the policies resulting from article 6015 of Title 10. It is also a small service when compared to the Navy, with no overseas deployments and fewer tactical and no strategic weapons. Its missions are diverse, however, and many of them are similar and some identical to those of the Navy. The Coast Guard also trains and operates extensively with the Navy in major fleet exercises. In time of war the Coast Guard comes under operational control of the Navy and assumes a primarily combatant role. Its peace-time functions are essentially rescue at sea and law enforcement.

The Coast Guard began regular recruitment and enlistment of women in 1973. Their assignment and placement were in primarily "traditional" ratings, (Hospital Corpsman, Yeoman, Storekeeper) ashore. However in 1977 the Secretary of

Transportation, Brock Adams, directed that women be assigned to sea duty in the Coast Guard and, in October of that year, the first women officers and enlisted personnel reported aboard two combatant "high endurance cutters" (HEC's), USCGC's Morgenthau and Gallatin. Currently, there are approximately 85 enlisted women and 15 women officers assigned to afloat duty in a total of 15 cutters, two of which have been commanded by women officers. [14]

To evaluate this program, several surveys, (attitudinal) of Coast Guard personnel have been conducted and the attitudes of senior officers have been elicited. The first of these, conducted in 1977, determined that:

1. Most women felt that their ability was no problem.
2. Acceptance of non-rated enlisted women as working equals by co-workers was not considered a problem at air stations or training commands.(A minority of those at other operational units did express concern over their acceptance.)
3. Subordinates' acceptance of women as their supervisors was considered a minor problem that would resolve itself over time.
4. Of all the women as a group, 63 percent said they "get along fine", and one-quarter of the women said they thought men felt that women should not be in the Coast Guard. [15]

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[14] Source for Coast Guard historical data is taken from Capt. J.A.Macdonough, USCG, "Integration of Women aboard a U.S.Coast Guard Cutter" Gender Integration in the Military Monterey, 1982 p.18

[15] These results were extracted from a survey conducted by T.W.Sinclair entitled Perceptions of U.S.Coast Guard Women Concerning Their Integration into Active Service Thesis from the Naval Postgraduate School, Monterey, Ca., 1977

With women assigned to the cutters, reports of the Commanding Officers indicated that "the women crewmembers had performed their duties fully and professionally and that the experience of having women in the crews had been highly satisfactory." [Ref. 15]. Additionally, in the opinion of the Commanding Officers of these destroyer-type ships, despite initial pre-integration apprehension, the integration of women into the crews had been an unqualified success. The Captain of the Morgenthau stated:

> I think, frankly, that it would be more of a strange experience for young men to come aboard a unit that was all male, because they would have to make the transition from a mixed society to an all-male ship. They do not have to do that on Morgenthau. It's there! It is what they are used to. Currently, the problem you have is the Chief, or first class, or somebody like me who has served aboard ships before, who comes aboard and finds that things are different now. I know there is something different, and I would like to think that by the time my tour is over, I won't recognize the difference. [Ref. 16]

In August of 1978, the Coast Guard removed all assignment restictions, service-wide, based on gender.

C. THE NAVIES OF OTHER NATIONS

As noted in Chapter One, women's roles in the military date back to antiquity and are therefore not limited to the United States. Currently, women serve in some capacity in eleven of the fifteen member nations of the North Atlantic Treaty Organization (NATO). While specific information regarding the attitudes of these nations' military personnel is largely internal in all but two cases, some general information regarding how womens' roles are viewed are published and are useful for the purpose of this study. In fact, the status of women is a part of the doctrine of NATO itself.

As a result of a series of conferences of the committee of Senior Service Woman Officers of the Alliance held at NATO headquarters during the period 1961-77, the following have been adopted as official policy guidance:

1. Women should share fully the traditionally male citizenship obligation to defend their countries.
2. Women should have equal rights with men as well as equal pay.
3. Women should have the opportunity to serve in all job specialties, but they should be excluded from combat roles unless the national situation demands it.
4. All NATO and national authorities should widen the employment of women within the military services.
5. Equal opportunity entails equal responsibility. [16]

As a result of these meetings, there now exists within the structure of NATO formal recognition of the status of women in the form of the Military Women's Committee, a subunit of the NATO Military Committee, which is the military policy body of the Organization.

Among the member nations, the role of women fills a diverse spectrum, influenced to a large extent by the cultural foundations of the countries themselves. As mentioned earlier, four of the members (Iceland, Italy,Luxembourg, and Portugal) do not employ women at all in the military. Of those that do, their (women's) roles vary from that of restricted to medical specialties only (such as in Germany and Greece), to that of unrestricted participation in jobs on ships at sea (such as in the U.S., Denmark, and the Netherlands). In Denmark, women serve in billets on patrol combatants, mine warfare ships, and fisheries protection vessels. Assignment of women to these combatants is not experimental here but is a routine assignment policy.

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[16] These points are included in NATO Charter Ammendments

D. THE DUTCH EXPERIMENT

The Royal Netherlands Navy, as a result of an active equal rights policy implementation drive initiated by the national government, conducted a one-year experimental assignment of women to a combat suport ship, HNLMS Zuiderkruis. The experiment was launched with the following objectives:

1. Male crewmembers should accept females as fellow crew in the fullest sense.
2. Females should feel fully accepted as crew by males.
3. The "home front" should accept gender-mixed crews.
4. The operational readiness of the ship should continue to meet operational standards.
5. The gender-mixed crew should be a contribution to the government's policy of equal rights for women. [17]

The results of the experiment, which involved a full operational tour including overseas deployment, were largely positive. This experiment was different than the U.S. policy of assignment of women to ships in two respects:

First, the vessel was considered by the implementors as combatant. As stated by the project group:

---

[17] Details of the Dutch study are extracted from a publication issued by the Project Group on Women in the Royal Netherlands Navy, Department of Social Research of the Royal Netherlands Navy entitled "Sailing with Women". The report is not published in the U.S., but is a gift copy to NPRDC, San Diego, loaned to the author by Dr. P.J.Thomas.

> It is a real warship, its sailing programme and operational area are the same as those of the frigates. That is why all the positions in such a ship are combat positions.

Second, the ship spent most of the entire year of the experiment out of home waters. It deployed to the United Kingdom, Portugal, the West Indies, the U.S. and Canada.

The ship had completed an overhaul period prior to the assignment of the women, and its employment was considered as standard routine workup for full operational readiness. The experiment had the following results:

1. Men accepted women as equal crewmembers, except where heavy physical work was involved.
2. Women generally felt accepted as equals by the men, except in the heavy work incidences, but felt that they were under excessive scrutiny and were subjected to sexual harrassment, although they unanimously regarded experience at sea as positive.
3. On the average, the home front had accepted mixed crews, but there was no verifiable measurement of this.
4. The operational readiness of the ship was maintained to required standards during the year, although extra effort was required to compensate for inadequate training of some of the women and lack of sufficient strength for certain tasks.
5. The gender-mixed crew was regarded as a positive contribution to the government's policy of equal rights for women.

Additionally, the project group recommended the expansion of the program to include full-time assignment of women to the Zuiderkruis, to another ship of the same class, to mine warfare ships, and an experimental assignment, much the same as the one conducted on Zuiderkruis, for a destroyer

(Standaardfregat). These have been undertaken by the Dutch Navy. As yet, no published results are available. The project group has also recommended opening the Royal Naval Academy and Naval War College to women.

E. ATTITUDES OF A SPRUANCE CLASS DESTROYER CREW

As a part of investigations into attitudes regarding the assignment of women to the Spruance class, the author assembled a questionnaire, initially intended to be administered by mail to a representative sample of active duty sailors currently serving on Spruance class ships. The questionnaire (presented in Appendix B) was designed to categorize respondents into several groups (according to length of service, previous experience and other groupings which are described below), and determine the attitudes of the respondents toward the concept of incorporation of women into the crews of their ships. Specifically, the variables of interest (items 6,7, and 8 on the forms) were:

1. Could a female sailor do your job? (Responses were yes or no, and, if not, why not?)
2. Could a female sailor stand your watch? (Yes or no, and,if not, why not?)
3. What would your reaction be to the announcement that your ship was to be assigned women as crewmembers? (Responses were arranged on a seven point Likert-type scale, from "strongly disagree"(=1) to "welcome aboard"(=7).)

The survey was intended to be sent to a sample of 350 enlisted personnel and 200 officers; however, because approval for conducting the mail survey was not granted, [18] it was decided that the questionnaire would be administerd in person to a much smaller sample. Approval for this was obtained, and the questionnaire was administered to the crew of a Spruance class ship in port in San Diego, Ca.

---

[18] Mail surveys require the approval of the Office of the CNO (OP-51) prior to their administration. Procedures are outlined in OPNAVINST 5102.7E. In this case, the survey was not approved "due to current policies regarding the assignment of women to sea duty" and the imposition of mail

1. Design of the Questionnaire

The questionnaire was designed to provide the following information about a respondent:

1. Years of service. (Groups of 4 years, 1-4, 4-8, 8-12, more than 12)
2. Rating area. (Groups of Navy ratings, Weapons, Engineering, Tehnician, Operations, Supply, and Administration)
3. Prior sea duty. (Same class ship or other class)
4. Prior service with females. (Sea or shore duty)
5. Marital status. (Married, never married, divorced or separated)

This information provides categories of people (such as first-tour single engineering department personnel that are married), to examine with respect to the variables of interest. The same information was elicited from both enlisted personnel and officers, with the slight modification for officers to determine "billet type" instead of "rating area".

The selection of a Likert scale to determine attitudes toward including female sailors in the crew was made to provide consistency in the responses, or an "anchor"effect. This was intended to "...give the response dimensions along which the investigator wishes the respondent to respond." [Ref. 17].

---

surveys on operating forces, which is considered to be intrusive and time consuming if there is no pressing need for the information the survey gathers. This somewhat restrictive policy is a result of large numbers of mail surveys that have deluged operational ships over the past few years.

Coding of the responses was fairly straightforward (although as tabulation and data entry progressed it became apparent that the initial sample size of 500-plus would have required a major investment in time). Numerical values were assigned to each response, each number to act as a discriminant 'flag' for categorization of respondents to be paired with the variables of interest; for example a '1' in the rating area indicating an engineer, a '3' in marital status indicating 'never married'. For the variables of interest themselves, a '0' indicates a positive response to questions 6 and 7, a '1' indicates negative. If the response was negative, a value of '1' for the followup "if not, why not" would mean "Job strength requirements" '2' would mean "lack of privacy", and so on. Analysis of the responses was performed using "minitab" statistical software to determine descriptive statistics. [19] The analysis of statistical information provided by the minitab software was performed in order to determine general trends in the responses and any specific categories of respondents that differed significantly from the group as a whole.

2. Administration of the Questionnaire

The questionnaire was administered to the crew of a Spruance class destroyer in port in San Diego which was employed in a maintenance period prior to participation in at-sea exercises. The question forms were distributed at morning quarters (an assembly of the crew conducted at the beginning of each working day). Sixty-five enlisted questionnaires and fifteen officer questionnaires were distributed randomly to junior officers and chief petty officers for further distribution to members of the crew. The officer questionnaires were issued individually to officers and collected in person. Enlisted respondents were asked to return their forms to a box on the ship's quarterdeck (the principal access and departure point for the ship). Complete anonymity of the respondents was guaranteed. This included the identity of the respondents themselves as well as the name of the ship. This, it was felt, would solicit a greater return rate and frankness in the responses.

---

[19] "Minitab" is a copyrighted statistical analysis software program designed by programmers at Pennsylvania State University. The edition of minitab used in this study is property of the IBM corporation and was utilized for analysis of the questionnaire responses on an IBM 3033AP mainframe computer at the Naval Postgraduate School in Monterey, Ca.

Of the 65 enlisted questionnaires distributed, 53 were returned. Of these, several were returned blank and several were returned with inconsistent or contradictory answers (e.g., respondent claimed no prior sea duty and simultaneously listed prior service with females at sea). As a result, 38 questionnaires were included as valid returns and were used for analysis. The fifteen officer questionnaires were administered and collected in person.

Since the sample size was small, the analysis of the returns was restricted to simple descriptive statistics, frequency diagrams, mean values, and responses by various categories to the variables of interest.

3. Results

The results of the questionnaire are summarized below:

1. The mean value for the group as a whole to the "react" variable (reaction to the announcement of assignment of women) was 4.77 This is above the median value of 4 (neutral).
2. Of the 38 responses (on the enlisted questionnaire) to the 'react' variable, only 6 were below the median value of 4. 10 chose the median value (indicating neutrality), and the remaining 22 were above 4.

3. Among the 'yrsvc' categories (years of service),the majority of respondents had less than 8 years active duty (25 of 38 of the enlisted responses and 12 of 15 officers)

Among officers responding:

1. The mean value for the 'react' variable was 4.33, again slightly above neutral.
2. Officers responded more positively to the question rgarding the habitability of their ship than did the enlisted respondents (5.6 as opposed to 5.0), but rated their reaction to the announcement of the assignment of women lower than did the enlisted respondents (4.33 as opposed to 4.95).

Table 4 provides summary minitab results.

These limited data can not provide a statistically significant view of the population of all sailors currently serving on Spruance class destroyers. They do, however, provide a useful insight in that the results as a whole do not show strong negative reaction to the concept of females in the crew.

With the sample restricted to a single ship and a relatively small sample size, it was not felt that detailed inferential statistics would be valid for this analysis. However, these responses suggest that there is at least a general acceptance of the concept of women serving in the crew.

F. THE CASE AGAINST GENDER INTEGRATION (ATTITUDES)

As was mentioned earlier, there is a strong element of tradition and traditional views regarding service at sea in ships. The statement of ADM. Bagley quoted in Chapter One remains valid today, in that the perceptions of a considerable number of young men, and therefore their attitudes

TABLE IV

ATTITUDINAL VALUES SUMMARY

Means of Likert Variables

Category YOS Group (Enlisted)	Mean Value
	'React'(reaction to assignment of women)
YOS 1-4	5.0
YOS 4-8	5.1
YOS 8-12	5.5
YOS >12	5.4
	'Habitability' (Living conditions on your ship
Officers	5.6
Enlisted	5.0

Note: Response data is summarized in Appendix B

regarding service in the Navy, do not include the concept of women in destroyers. What impact this would have on recruitment and retention of qualified people, both officer and enlisted, should integration of combatants be enacted as policy, is unknown. There would undoubtedly be a negative impact to some degree on recruitment and retention because of the traditional view of life at sea held by most of the relevant population,(those in or likely to join the Navy).

Enactment of any program with so fundamental an impact on the nature of a way of life is bound to bring a concommitant reaction from those it affects, and will in large part be negative. Of those who used the opportunity to write comments on the questionnaire, three of four were negative. One respondent stated:"Women do not belong at sea, period. They have no business on ships. In a fire or a battle, they would panic and cause confusion."

Several verbal comments made to the author during the course of the study were in a similar vein. One senior officer, when told the title of the project, rolled his eyes and said:"What in hell are you looking at that for? It's against the law in the first place, and even the program on tenders is a disaster."

Although no substantive proof of the success or failure of the program on tenders involving integration of women, or for that matter any group or minority, is likely to emerge as an ironclad truth, the fact remains that such change has and would cause disruption in the attitudes and perceptions of those on the receiving end, in this case the crews of a destroyer class. Such disruption for the sake of mere social experimentation, when a current system of selection and asignment (men only) is working, is arguably inappropriate. Only in the face of economic or national security need, or in the event of legislated change to current laws and policies, would such a radical change in the nature of combatant service at sea be justified.

G. SUMMARY

This chapter has examined the attitudes of people involved in gender integration programs for ships. The Navy's experience in tenders, support ships, and other ships in which women serve has been largely positive as reflected by the attitudes of the people involved. The Coast Guard, the service with the greatest degree of gender integration, is also experiencing successful and positive acceptance of the program.

Other nations' Navies have initiated programs for women in sea duty. However they have been largely limited to traditional roles. A notable exception is the Dutch Navy, which has sent women to sea in an equal status with men in Nato deployments. Again, this has been generally successful, with both male and female crewmembers expressing positive attitudes.

Finally, the attitudes expressed by the crew of a Spruance class destroyer indicated an overall acceptance of the concept of inclusion of women into their crew. These respondents also expressed a highly positive attitude regarding the habitability of their ship.

The implication of attitudinal data so far is that there is growing acceptance of the concept that women sailors can function effectively in non-traditional roles at sea. There is also evidence, from both the written comments on several of the questionnaires administered and from verbal comments to the author, that there are strong feelings regarding the traditional view of life at sea in destroyers. In light of this, the assignment of women without careful study and indoctrination, and without public approval in the form of a change to current law, would be disruptive.

V. CONCLUSIONS AND RECOMMENDATIONS

Admiral James Watkins, currently the Chief of Naval Operations and a former Deputy CNO for manpower, stated in 1978:

> The onset of the All Volunteer Force has provided us an additional incentive to improve our utilization of young women in the national human resource pool. The projected decline of eligible males in the 80's and beyond has increased the urgency of efforts in this area. Coincident with the increased readiness and economic incentives for the utilization of women has been an increased recognition by our society, including the Armed Services, of the obligation to provide greater opportunities to enjoy full and rewarding careers in the service of their country. [20]

With this orientation of the key Navy policymaker in mind, the conclusions of the author of this thesis are set forth in the hopes of furthering the objectives of increased readiness and equitable career opportunities for all in the modern Navy.

A. CONCLUSIONS

From preliminary analysis of the topics covered in the preceding chapters, this author concludes that the issue of assignment of women to combatant ships is a valid area for conducting further research, and that there are reasonable factors that merit consideration of this issue for policy study. Specifically, these include the following:

---

[20] Quoted from testimony before the Subcommittee of the House Armed Services Committee on Military Personnel, 21 March 1978.

From all indications, the Spruance class destroyer is compatible, in terms of habitability and operability, with the assignment of women to the crew.

There appears to be evidence of the general acceptance of the concept of women at sea as indicated by existing attitudinal studies, and there is acceptance of the assignment of women to the crew by the crew of one representative of the class.

Current restrictions on assignment of women to combatants inhibit, to a certain extent, career paths for women, particularly for women officers who choose to go to sea.

Research on physical strength standards and determination of these standards for shipboard jobs is incomplete in that these standards, while some have been defined, are not incorporated in the manpower requirements determination methods for ships. They also are not used as screening or selection devices in the crew training pipeline. Because of the general ability of male crews to compensate for strength deficiencies of other males, there is at present no economic justification for incorporation af such standards as screening devices.

The current economic climate in this country and other factors,including intangibles such as resurgence of national pride and respect for military service, are serving to maintain adequate numbers of qualified volunteers for the Navy. These factors are also serving to maintain a strong sense of traditionalism. Additional programs for expanding women's roles generally are not successfully campaigned in times of plenty.

B. RECOMMENDATIONS

Based on the above conclusions, recommended actions include the following:

O Solicit attitudinal data from active duty Navy women and from potential female and male recruits regarding the concept of unrestricted sea duty for both men and women. This would yield insight into the effects such a policy would have on accessions and retention.

O Study the dollar costs (and benefits) of integrating existing strength and functional standards and developing more of them tailored to shipboard jobs for inclusion as screening and selection devices in the recruit pipeline. This would provide data to justify or negate such inclusion should this policy issue arise in Congress.

O To compensate for known, documented deficiencies in the physical strength capabilities of most females, consider restricting the shipboard assignment of women (on all ships) to ratings not conflicting with the general strength characteristics of most women. These could include ratings in the technician, clerical and ship's service areas (e.g., ET, EW, OS, DS, SH, YN, PN, PC, DK, SK, MS, FT, HM, RM, SM, QM, IC, and possibly GSE). Restrict certain ratings to males based on physical strength requirements that are job-related (e.g. BM, HT, EN, MA, GM). This is, in other words, "rating-limited" as opposed to "billet- limited" assignment policy.

O Institute a pilot study of assigning women to the crew of a Spruance class destroyer on an experimental basis.

Assign the ship a 'training' status for the purpose of compliance with 6015. Evaluate the program on the basis of acceptance by both sets of the crew, the operational performance of the ship in standard at-sea exercises and in the multitude of inspections ships go through, and on the public perceptions of such a venture. This would provide a data base for the Navy to use should resolution of the women in combat issue be resolved in favor of such policy.

C. POLICY CONSIDERATIONS

There seems to be a cyclical effect in policy determination that responds to societal pressures and national moods. During the Carter administration, the driving forces to increase the roles for and utilization of women in the military were fairly strong. There was a pronounced "liberal" flavor to many of the defense policies of that administration that have since been reversed as a result of political, economic and other factors. As a result, the concept of gender integration of another aspect of military life is not highly visible; in fact, it would appear to be on the decline. However, the same societal, political, and economic forces that mold voting attitudes in the public have not ceased to exist. Defense manpower analyst Martin Binkin, in a recent study of the all-volunteer military's status, has listed options available for the continued success of the force in the face of the declining pool of males and the economic recovery. Among these was the increased utilization of women. He states:

> At bottom, the principal issue involving women and the military is the extent to which remaining laws and policies that constrain further expansion are justified by valid national security concerns or instead are anchored to sexual stereotypes of an earlier era. The future utilization of women--and perhaps the future of the volunteer concept--will depend on the resolution of this issue. [Ref. 18].

It is the general conclusion of this study that the assignment of women to the crew of this revolutionary naval combatant is indeed feasible, and, depending upon resolution of the above issue, may become a necessity in the years to come.

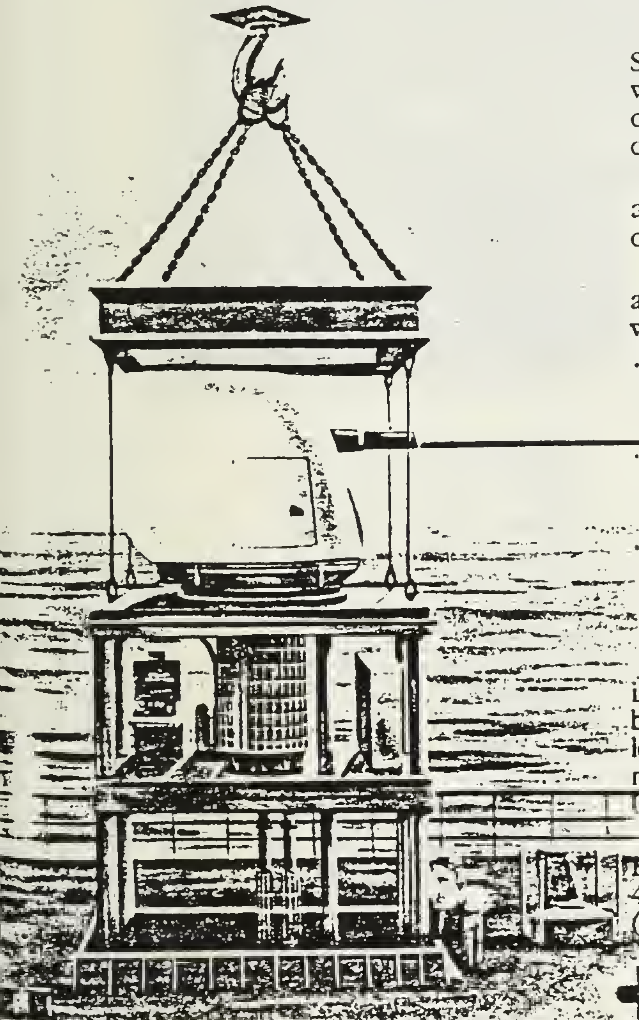
While there is currently a situation that provides the Navy with adequate recruits and careerists to fill the billets in ships at sea, there is no guarantee that this favorable situation will continue. Forecasts of future requirements and future supplies of eligible manpower resources indicate that more information should be gathered on the use of women in an increasing number of military roles.

APPENDIX A

MODULAR SYSTEMS

A modular weapon concept for surface combatants.

Mk 45/SSES: packaged to go wherever needed.



Using the Navy's new Ship Systems Engineering Standards (SSES), major weapon systems in the future will be adapted to fit modular suites in surface combatants. FMC has already completed the modular design to outfit the Mk 45/Mod 1 gun system to SSES.

In addition, many other FMC weapon systems, already modular to a high degree, are being configured to SSES.

FMC is a strong proponent of the SSES program and has participated since the start of this effort, which is to:

- Eliminate the need for "custom built" ships with hulls designed to accommodate only the initial combat suite.
- Allow concurrent design and development of ship and combat systems on separate critical path schedules.
- Offer flexibility for change/upgrade of armament and electronics to permit more rapid use of advanced technology and/or to suit various mission needs throughout the service life of a ship.

FMC's experience with modular weapon systems includes integrating Mk 45 to MEKO class frigates built by Blohm + Voss of Hamburg, Germany. As a leading design agent for the SSES program, FMC stands ready to provide modular weapons systems for the United States Navy of the future.

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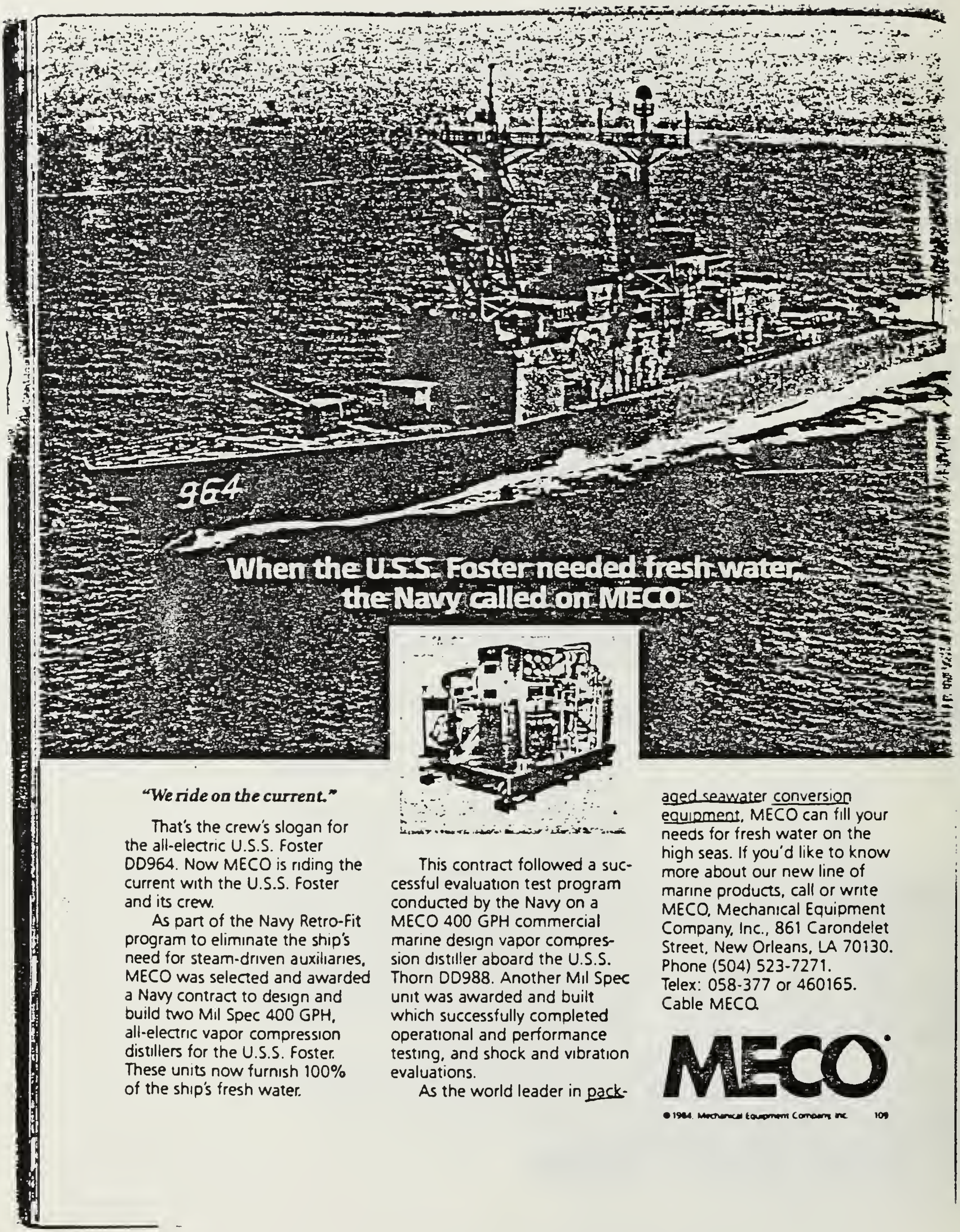

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This contract followed a successful evaluation test program conducted by the Navy on a MECO 400 GPH commercial marine design vapor compression distiller aboard the U.S.S. Thorn DD988. Another Mil Spec unit was awarded and built which successfully completed operational and performance testing, and shock and vibration evaluations.

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APPENDIX B

ATTITUDINAL SURVEY AND RESPONSE DATA

INSTRUCTIONS: This survey is being conducted as a part of thesis research at the Naval Postgraduate School Monterey, Ca. It is non-attributable; that is, your responses are confidential and non-traceable. Please check/circle the appropriate response. Your time in answering these questions is appreciated.

1. How many years of service do you have ?

0-3 ___

4-8 ___

more than 8 ___

2. What type billet ?

DIV OFF ___

DEPT HD ___

WARRANT/LDO ___

3. Have you served a sea tour prior to this one?

Yes ___ No ___

If yes, same ship class?

Yes ___ No ___

If another class:

Combatant ___

MLSF ___

Amphib/Salvage ___

Tender ___

4. Have you ever served with female personnel?

Yes ___ No ___

If yes, what type duty?

Sea ___ Shore ___

INSTRUCTIONS: This survey is being conducted as a part of thesis research at the Naval Postgraduate School Monterey, Ca. It is non-attributable; that is, your responses are confidential and non-traceable. Please check/circle the appropriate response. Your time in answering these questions is appreciated.

1.How many years of service do you have?

1-4___

4-8___

8-12___

over 12___

2. What is your rating area?

ENG (MM,BT,GS,EN,HT,MR,EM,IC) __

WEPS (GM,FT,BM,TM)__

TECH (ET,EW,DP,TD) __

OPS (OS,RM,QM) __

SUP (SK,MS,SH,DK) __

ADMIN (YN,PN,NC,MA,PC) __

3. Have you served a sea tour prior to this one?

Yes __ No __

If yes, same ship class? Yes __ No __

If no, other class:

Combatant (CG,DD,FF) __

MLSF/SALVAGE (AO,AE,ASR,ATF,AFS) __

AMPHIB (LPD,LSD,LKA,LHA,LPH,LST) __

TENDER (AD,AR,AS) __

4. Have you served with female personnel? Yes __ No__

If yes, what type duty? Sea __ Shore __

5. What is your marital status? Married ___

Separated/divorced ___

Never married ___

6. In your professional opinion, could a female sailor do your job? Yes ___

No ___

If no, indicate your reason below: (choose one)

Job physical strength requirements ___

Lack of shipboard privacy ___

Emotional stresses of sea duty ___

Other factor (Please list) :

7. In your professional opinion, could a female sailor stand your watch? Yes ___

No ___

If no, indicate your reason below: (choose one)

Watchstation physical strength/stamina requirements ___

Emotional stress of the watch ___

Other reason (please list) :

8. What would your reaction be to the announcement that your ship was to be assigned women as crewmembers? (circle a *)

Strongly Welcome
*   *   *   *   *   *   *
Disagree Neutral Aboard

9. How do you rate the habitability(living conditions)of your ship?

*   *   *   *   *   *   *
Worst Afloat Acceptable Best Afloat

9. If you would like to make more detailed comments, please write them here. Again, your time spent in answering these questions is appreciated.

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Retrieve 'survey'

 THE  FOLLOWING  TABLE  LISTS RESPONSES  FROM  THE  ENLISTED
QUESTIONNAIRE

Describe c1- c14
 YRSV       N =   38    MEAN   =    2.1842      ST.DEV.    =
1.01
 RATE       N =   38    MEAN   =    3.3684      ST.DEV.    =
1.48
 PRISEA     N =   38    MEAN   =   0.52632      ST.DEV.    =
0.506
 SAMECL     N =   38    MEAN   =    4.9211      ST.DEV.    =
4.14
 OTHCL      N =   38    MEAN   =    6.7632      ST.DEV.    =
3.40
 PRIFEM     N =   38    MEAN   =   0.84211      ST.DEV.    =
0.370
 YPDU       N =   38    MEAN   =    7.6842      ST.DEV.    =
3.09
 MARSTAT    N =   38    MEAN   =    1.8684      ST.DEV.    =
0.906
 JOB        N =   38    MEAN   =   0.15789      ST.DEV.    =
0.370
 IFNOT      N =   38    MEAN   =    7.8421      ST.DEV.    =
2.72
 WATCH      N =   38    MEAN   =   0.55263      ST.DEV.    =
2.04
```

```
 WHYNOT     N =   38    MEAN   =      8.3947      ST.DEV.    =
2.10

--  THE FOLLOWING  TABLE LISTS  RESPONSES  FROM THE  OFFICER
QUESTIONNAIRE


Retrieve 'offsrvy' -- Describe c2-c15
 YRSVC      N =   15    MEAN   =      1.8000      ST.DEV.    =
0.775
 BILLET     N =   15    MEAN   =      1.4000      ST.DEV.    =
0.632
 PRISEA     N =   15    MEAN   =     0.46667      ST.DEV.    =
0.516
 SAMCL      N =   15    MEAN   =      4.7333      ST.DEV.    =
4.13
 OTHCL      N =   15    MEAN   =      5.5333      ST.DEV.    =
3.44
 PRIFEM     N =   15    MEAN   =     0.73333      ST.DEV.    =
0.458
 TYPDU      N =   15    MEAN   =      6.8000      ST.DEV.    =
3.78
 MARSTAT    N =   15    MEAN   =      1.9333      ST.DEV.    =
0.961
 JOB        N =   15    MEAN   =     0.40000      ST.DEV.    =
0.507
 IFNOT      N =   15    MEAN   =      6.1333      ST.DEV.    =
3.64
 WATCH      N =   15    MEAN   =     0.20000      ST.DEV.    =
0.414
 WHYNOT     N =   15    MEAN   =      7.4667      ST.DEV.    =
3.18
 REACT      N =   15    MEAN   =      4.3333      ST.DEV.    =
2.23
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 HABILTY    N =   15    MEAN  =      5.6000      ST.DEV.   =
1.30 -- stop

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